also Professor of Mathematics at the same college. Although by no means a voluminous writer, he contributed occasional papers to the Geological Society and to the *Geological Magazine* on the carboniferous rocks of the north of England, on sub-aërial denudation, on the geology of Donegal, the Malvern Hills, &c. His practical knowledge of geology, his clear head, and sound judgment rendered his advice on matters of engineering geology of great service. Consequently he was engaged here and there in many important undertakings, more especially in reference to coal-mining, water-supply, &c. This work, perhaps unfortunately, was needful, for it exhausted those energies that might have been more advantageously directed to the advancement of knowledge. Professorships of geology are not, however, lavishly endowed. Visiting portions of South Africa in the course of practical work, he was able to obtain a considerable insight into the geology, and brought his results before the Geological Society. Not the least important of his labours was his manual of Physical Geology, admittedly the best English work on this branch of the science, and one which reached a third edition in 1882. The companion volume on Stratigraphical Geology was never completed, and indeed other publications perhaps rendered it unnecessary.

After the resignation of Prof. Prestwich in 1888, he was chosen to succeed him in the chair of Geology in the University of Oxford. Here he found abundance of work to do in the arrangement of the geological museum, in his lectures and class excursions. A large task, indeed, still remains to be done in the examination of many treasured specimens that have never yet been exhibited. Prof. Green took great interest in this work, and in the acquisition of new specimens. Only recently he spent some time in selecting a series of fossils from the valuable collection of the late Thomas Beesley, of Banbury, which had been presented to the Oxford Museum by Mrs. Beesley.

Prof. Green was elected a Fellow of the Royal Society in 1886, and he served on the Council during the years 1894-95. For many years he gave lectures on geology at the Military School at Chatham; he was an examiner in geology for the University of London; and had been President of the Geological Section of the British Association at Leeds in 1890.

Early in August he was afflicted with a stroke of paralysis, and a second attack terminated his busy and useful life on the 19th of the month. Eminently genial and kind-hearted, he will long be missed by his many friends.

H. B. W.

NOTES.

AT the Leyden International Zoological Congress, held last year, it was decided that the next meeting of the kind should take place in England, in September 1898, and that Sir William Flower, Director of the British Museum (Natural History), should be its President. We now learn, through the *Times*, that it has been determined that the 1898 Congress, the fourth of the series, shall meet at Cambridge, under the auspices of the University, simultaneously with the International Physiological Congress, which has arranged to go there in that year. London and Edinburgh were named as places of meeting in connection with the Zoological Congress, but it was felt that there were certain advantages in holding an international meeting of this character in a University town within easy distance of London, rather than in London itself. The organising and reception Committee consists of Prof. Alfred Newton, President; Mr. Adam Sedgwick, Vice-President; Messrs. J. W. Clarke and Sydney J. Hickson, Treasurers; and Messrs. S. F. Harmer and Arthur E. Shipley, Secretaries. With reference to the two prizes which will be awarded at the Congress for the best zoological papers, the Paris members of the permanent Committee suggest that the subject for the Tsar Alexander III. prize, which will be given for the first time, shall be "The Study of the Ruminant Mammalia of Central Asia, from a Zoological and Geographical Standpoint"; and that for the Tsar Nicholas II. prize, which was awarded last year at Leyden for the first time, the paper shall be "An Anatomical and Zoological Monograph of a Group of Marine Invertebrates." These subjects are, however, in the nature of proposals which may be modified, since the Paris Committee will be glad to receive counter-suggestions and to learn the views of zoologists before making public the detailed programme of the prizes.

THE annual conference of the Iron and Steel Institute opened at Bilbao on Tuesday, under the presidency of Sir David Dale. Various papers were read, and in the evening a grand reception was given by the municipal authorities in honour of the Institute.

INFORMATION has been received through Reuter's agency of the finding of an extensive gold-bearing quartz reef at Cape Broyle, Newfoundland. The analysis shows nearly three ounces of gold to the ton of quartz, and over one ounce of silver. The barrels of quartz sent for analysis were taken at random.

DR. E. S. HOLDEN announces in *Science* the following gifts to the Lick Observatory:—By Miss Caroline W. Bruce, of New York City, a sum of money to procure a large comet-seeker, and to provide photometers for visual use with the thirty-six-inch equatorial; by Mr. Walter W. Law, of Scarboro'-on-Hudson, a liberal gift towards providing for the publication of the Observatory Atlas of the Moon, mentioned in the *Publications*, vol. viii. p. 187.

THE forty-first annual exhibition of the Royal Photographic Society is in course of preparation, and will be opened to the public on Monday, September 28. On Saturday, September 26, there will be a private view, followed in the evening by a conversazione, at which the President and Council will receive the fellows, members, and their friends. The judges this year in the technical section are Captain Abney and Messrs. Chapman Jones and Andrew Pringle. Exhibits must be delivered at the Society's rooms, at 12 Hanover Square, not later than the morning of September 10.

PARTICULARS of the International Horticultural Exhibition to be held in Hamburg, from May to September next, have now come to hand. The Committee proposes: (1) a Permanent Exhibition, out-of-doors and under cover, from the beginning of May 1897, to the end of September, 1897; (2) a Spring Exhibition, from May 1 until May 7, 1897; (3) a Special Exhibition of plants, flowers, and vegetables, from May 30 until June 3, 1897; (4) a Special Exhibition of plants, flowers, and shrubs, from July 2 until July 6, 1897; (5) a Special Exhibition of plants, flowers, and fruits of the season, from July 30 until August 3, 1897; (6) a general Autumn Exhibition from August 27 until September 5, 1897; (7) a general Fruit Exhibition, from September 17 until September 30, 1897.

THE seventh annual general meeting of the Federated Institution of Mining Engineers is announced to take place at Cardiff on September 15, 16, and 17. Some thirteen papers are on the agenda, and many excursions have been arranged. An invitation has been given to the Federated Institution, among others, by the Canadian Mining Institute, to hold a meeting in Montreal at about the date of the meeting of the British Association in Toronto next year; but before replying, the Secretary of the Institution is anxious to learn the names of those who may be expected to be present on the occasion.

KIEF has been selected as the place of meeting of the tenth conference of Russian Naturalists and Physicians. The conference will last from August 21 to August 30, 1897. A grant of over £400 has been contributed by the University of St. Vladimar in Kief towards the expenses.

GOOD progress is being made by the Russian National Health Society in the matter of the Jenner Commemoration of October next. The centenary work, containing a life of Jenner and translations of all his works, as well as an historical notice of the development of vaccination in Russia and other European countries, is likely to be a volume of much interest and value. It will be illustrated by over a hundred figures, including many reproductions of Jenner's original drawings, portraits of Jenner, and views of the Berkeley neighbourhood. The Society, under whose auspices the commemoration is to take place, is already in receipt of a large number of loans and gifts for the exhibition which it is proposed to hold in connection with the celebration, and these have come from well-nigh every part of the world. England, it is said, is not too well represented by exhibits.

NEWS comes from Russia of another medical society having received the, in that country, necessary Imperial approval of foundation. It is to be known as "The Society for Combating Infectious Diseases," and will be under the patronage of the Princess of Oldenburg. The society will resemble the Russian National Health Society, in that it will admit both lay and medical members.

ACCORDING to *Science*, an observatory for terrestrial magnetism has been established in connection with the astronomical observatory at Munich, and Dr. Franz von Schwarz has been appointed director. *Science* also states that the Observatory of the School of Technology at Karlsruhe is to be removed to Heidelberg. The Director of the Observatory, Dr. Valentiner, has been made a Professor in the University of Heidelberg.

A MAGNETIC survey of Maryland is being made by Dr. Bauer, the editor of *Terrestrial Magnetism*, under the auspices of the State Geological Survey.

THE *Engineer* states that Colonel Home, C.S.I., Royal Engineers, has been engaged by the New South Wales Government as an expert to advise on the subject of water conservation.

THE *British Medical Journal* learns from Amoy, China, that Dr. Yersin has been experimenting with his plague serum. Up to date he is reported to have cured more than twenty plague patients. The cures are reported to be marvellous, as many of the patients were in high fever, the buboes fully developed, and the sufferers in a comatose state. In Canton Dr. Yersin, on July 1, 1896, according to Bishop Chausse, effected a remarkable cure on a very unmistakable and severe case of plague. After showing the Amoy doctor his methods of injection, he returned to Saigon. It is stated in the newspapers in China that it takes six months to prepare the serum; that Dr. Yersin first inoculates rats and then horses, from which sources he obtains his fluid.

THE subject of the Baumgartner Prize for 1899, awarded by the Vienna Academy of Science, is "the extension of our knowledge of ultra-violet rays."

THE Leopolinisch-Carolinische Academie of Halle is, it is stated, about to publish Cuvier's first work, which is on the edible crabs of the French coast. It dates from the year 1788. A number of letters of Cuvier are in the possession of the Academy, and these also it is intended to publish.

THE University of Moscow has been presented with a portion of the collection of butterflies of the late Prof. A. M. Butljero, and the Museum of Natural History, Berlin, has had bequeathed to it, by the late Julius Flohr, that gentleman's collection of Mexican insects.

SOME one once rather unkindly said that one half of the British population was always endeavouring to shut up the other half in asylums of one kind or another. Though this remark may be a trifle exaggerated, it may be applied with some truth if societies or associations be read for asylums. The latest association which has appealed for our support is for the Harmonious Development of Faculties. The Association aims at bringing about a clearer apprehension of the co-relationships of physical, moral and intellectual faculties. Anything that contributes to the harmonious development of these is good; anything that hinders this development is evil; these are briefly the ethical rules of the Association. The Committee believe that they are spreading a philosophical truth which will have an elevating influence over men's minds. They therefore wish us to draw attention to the existence of the Association, and this we have now done, leaving to our readers the contemplation of the doctrine to which we have referred. The Hon. Secretary of the Association is Prof. M. Deshumbert, Camberley, Surrey.

DR. W. L. ABBOTT, of Philadelphia, has been well employed during the past eight years in exploring various parts of the Old World, and sending his collections to the National Museum at Washington. Mount Kilima-njaro and the adjoining districts of East Africa were the scenes of his first investigations, after which he visited the Seychelles, and the neighbouring islands of the Indian Ocean. He then proceeded to Northern India, and passed two years in Cashmere, Ladak, and Turkestan. From all these localities numerous collections of natural history and ethnology have been transmitted to Washington, where the members of the staff of the National Museum are busy in working out the results. Two of their reports on the birds collected by Dr. Abbott have just reached us. One of them, by Mr. Ridgway, describes the specimens obtained in the Seychelles, Amirantes, Gloriosa, Aldabra, and other adjacent islands, many of which had not been previously visited by a naturalist. In Aldabra, generally known as the home of gigantic tortoises, Dr. Abbott met with forty-five species of birds, several of which are representative forms peculiar to that island. In a second memoir Mr. Richmond gives us an account of 746 "well-prepared specimens" which Dr. Abbott has accumulated in Kashmir, Ladak, and Baltistan, and refers them to 188 species. Most of these are, of course, well known to Indian ornithologists, but Mr. Richmond ventures to describe as new a Blue-throat from Ladak, under the name *Cyanecula abbotti*.

DR. NICOLA TERRACCIANO has contributed to the Transactions of the R. Accademia delle Scienze fisiche e matematiche, of Naples, an important memoir on the flora of Monte Pollino and the surrounding district. This group of mountains, situated between Calabria and the Basilicate, has for some time attracted the attention of Neapolitan botanists, and the number of species in its flora now amounts to 1468, exclusive of varieties. Dr. Terracciano notes as new to the Italian flora, *Gagea minima* and *G. amplyopetala*, and he describes four altogether new species, namely *Fritillaria pollinensis*, *F. intermedia*, *Ornithogalum ambiguum* and *Narcissus pollinensis*, together with many other forms which he considers varietal.

THE estimation in which certain gramineous species are held varies much in different countries. For instance, *Holcus lanatus*, which in Britain is universally regarded as a weed, though it intrudes abundantly upon many of our pastures, is deliberately sown in mixtures of meadow-grass seeds in France. The *Agricultural Gazette of New South Wales* (vii. 5) cites another example in the tufted hair grass (*Deschampsia cæspitosa*, Beauv., or *Aira cæspitosa*, Linn.). This species is locally known in England as tussock grass, and as "bull faces" or "bull pates," and efforts are constantly made to extirpate it from our permanent pastures. In Australia, however, "it affords a fair pasturage if periodically burnt down." Graziers on and near the Australian Alps have been asked to send notes of their observations of this species, as it is regarded as quite possible that the Australian plants differ in forage value from those of the northern hemisphere. The culms are sufficiently tough to permit of door-mats being made from the hay.

WHAT is known as the "shade-tree insect problem," in the Eastern United States, forms the subject of an illustrated bulletin of the Department of Agriculture at Washington. The great abundance of insects which attack shade-trees was a noteworthy feature in many of the cities in the summer of 1895. In almost every low-lying town from Charlotte, N.C., north to Albany, N.Y., the elm-leaf beetle *Galerucella luteola* defoliated the English elms, and often the American elms. The bagworm (*Thyridopteryx ephemeræformis*), the white-marked tussock moth (*Orgyia leucostigma*)), and the fall webworm (*Hyphantria cunea*) are conspicuous amongst the depredators. Some species of trees suffer much more than others, the beeches, hornbeams, and alders appearing to have few insect enemies. Spraying and banding of trees and other checks are being employed, and one of the Washington newspapers has advocated the formation of a tree protection league amongst the citizens.

A CORRESPONDENT in the *Grahamstown Journal* tells how he cleared his garden of a pest of locusts. A number of diseased insects were obtained and ground into a fine powder, which was then placed in a bucket of water. Some of the mixture was poured on a few locusts of a fairly good-sized swarm, and before many days had elapsed numbers of the locusts were found dead, and eventually the garden was quite clear of the pest.

ON account of the great success of the botanical models made by the firm, Herrn. R. Brendel, in Berlin, the same firm is now constructing zoological models out of papier-mâché, some of which are exhibited in the Berlin Exhibition this summer. For instance, there is a model of the ordinary house-fly (*Musca domestica*) thirty times life-size; it is very accurately made, and all its parts are beautifully worked and distinct, making it unnecessary to take it to pieces. By means of a small piece of mechanism the spreading of the wings can be demonstrated. There is also exhibited, in a series of eight models, a plaster representation of the development of the frog, each being ten times life-size; they are all so arranged that they can be lifted off their supports and examined more minutely. With the help of such useful models as these, students of zoology will be more easily able to grasp some points which cannot always be obtained from pictures or diagrams. These models should also be found most useful in schools where the pupils do not often come in contact with museums.

IN Italy, almost the only instruments used for the study of earthquake-pulsations are long and heavy pendulums. The greater the length the more steady is the bob during movements of the ground, and the heavier the bob the more readily is the friction of the recording pens overcome. In the last number of the *Bollettino* of the Italian Seismological Society (vol. ii., 1896, pp. 62–65), Dr. A. Cancani describes the latest form of seismometrograph constructed under his superintendence. Two instruments have been made, one for the geodynamic observatory at Rocca di Papa, and the other for that at Catania. The former is 15 metres long and 200 kg. in mass, the latter is 26 metres in length and has a mass of 300 kg.; in other respects they are almost identical. The suspending wire of the pendulum passes at its lower end through slits in the short arms of two horizontal levers. The slits are at right angles to one another, but the levers are bent at an angle of 45° in opposite directions, so that the pens at the free ends of the long arms write their component records side by side on the same moving band of paper. The paper is driven at the rate of 60 cm. an hour, a velocity great enough to allow the individual undulations to be examined, and the times of the different phases to be determined with considerable accuracy.

THE restlessness or alarm shown by birds and animals before the occurrence of an earthquake sensible to man is now well known, and is probably due to the very small tremors which precede the larger vibrations. In an interesting paper (*Boll. Soc. Sismol. Ital.*, ii., 1896, pp. 66-74), Dr. A. Cancani has collected a large number of examples observed in Italy. He points out besides the important fact that, while most animals are disturbed during and after an earthquake, it is only at some distance from the epicentre that they exhibit any signs before the shock is perceptible to man. The explanation Dr. Cancani gives is that the tremors move with a greater velocity than the large vibrations, but that a considerable space must be traversed before they have outraced the latter by several seconds.

IN the *Bulletin* of the Constantinople Observatory for January 1896, Dr. Agamennone concludes his summary of the earthquakes felt in Turkey during the year 1895 (see NATURE, vol. liv. p. 373). The number of recorded shocks amounts to 400, and these are found to belong to thirty-one seismic centres, the principal of which are near Paramythia, Imam Keuy (Aïdin), and Pergama. In the neighbourhood of Constantinople at least ten earthquakes had their origin, showing that the seismic activity provoked by the great shock of July 1894 has not yet ceased.

WE have received from Prof. G. Vicentini a new and valuable contribution to our knowledge of earthquake-pulsations, consisting of a list of the disturbances registered by his two-component microseismograph at Padua from February to September 1895. Many of these can be referred to known shocks, occurring either in Italy or in neighbouring countries. On three occasions (March 6, June 15, and July 5) the origin of the pulsations is unknown, but the diagrams are similar to those that are produced by earthquakes taking place at a very great distance. Copies of the diagrams corresponding to twenty-two earthquakes are reproduced on a scale two-thirds of the original.

IN the current number of the *Journal* of the Anthropological Institute of Great Britain and Ireland (vol. xxvi. No. 1) Mr. Robert M. W. Swan gives some very interesting notes on ruined temples in Mashonaland. These temples are of the Zimbabwe style; *i.e.* they seem to take the form of circular arcs, if not complete circles. Practically only one he describes—that of the temple at Lundi River—attains to anything like a circular shape, and this is very complete, being only pierced by two openings. The others scarcely reach 180°, and these seem always to be pierced by a doorway. The temple at Lundi River stands on a little knoll about half a mile south of the waggon road, and 300 yards towards the east of the river. It is built of small rectangular, naturally-shaped blocks of granite, laid in very regular level courses. From the fact that the inside finely-built wall supports, to some extent, many of the stones of the outside wall, it is suggested that it is probable both were built at the same time. Mr. Swan took measurements of the different parts of the building. The circumference of the temple was 169 feet 6½ inches, or 17·17 feet × π^2 (10 cubits × π^2). At no point did the foundations of the temple diverge more than a few inches from a true circle. The two doorways into the building were 60 feet 8¼ inches distant from one another, the angles between the doors subtending an angle of 128° 51′ at the centre. One of the doors formed with the centre of the temple a north and south line, so that it is supposed that the wall between these two doors was intended to face the sun when rising at the summer solstice. Many other interesting points of this temple are referred to by Mr. Swan. To give some idea of the great number, he says: "From what I have said it will be seen that, along the 250 miles or so of road between the Lobsani and Lundi rivers, I have visited about twenty temples, or other remains of the people who built Zimbabwe . . . but admitting that I have seen all within a mile on both sides of the road, and that the strip of country traversed is a fair sample, as regards ruins, of this part of Africa, it is evident that the number of ruins of this class in the whole country between the Zambesi and Limpopo rivers must be enormous." Further on he says: "On a hill further on, I found four temples of the same sort, and one little crescent of rough stones carefully oriented to the sun rising at the northern solstice. In fact these temples are so numerous in this part of the country, that one might safely undertake to find a hundred of them within ten miles of Salisbury." Mr. Swan, in a postscript to his paper, suggests that these temples are not temples in the ordinary meaning of the word, but simply religious symbols, analogous, as he says, to our crosses and wayside shrines. The article contains several other points of interest, too long, however, to be dealt with here.

An extraordinary incident is reported in *Engineering*, from Terre Haute, Indiana, by the city engineer, Mr. G. H. Simpson. A street of this town was paved with brick five years ago, the joints being grouted up. The work was done partly during the winter, being finished in early spring. The foundation consisted of broken stone 8 in. thick, above which was a layer of sand 2 in. thick. At the end of last July, with the thermometer standing at about 100° F., a section of the pavement rose like an arch from its foundation, and though water was turned on to it, and openings made to let out any possible accumulation of gas beneath, it maintained its position unaffected. Men were then put to work to repair the pavement, but hardly had they removed the swollen section when, with a loud report, another section of the pavement rose in a similar manner to a height of 7 in. to 9 in.

We have received the fourth yearly report of the Sonnblick Society, containing the results of the meteorological observations made at the summit of that mountain for the year 1895. In addition to the usual obligatory observations, the observer, at the instigation of Dr. Pernter, made a special study of the crackling or humming of the telephone, and by this means, the occurrence of thunderstorms was frequently predicted. The records of this phenomenon have been discussed by Dr. W. Trabert, who finds that in all years, during the winter season, the noise gradually decreases from 7h. a.m. until noon, and then increases until about 9h. p.m.; while in the summer season the minimum occurs about 7h. a.m., from which time the humming steadily increases until 9h. p.m. The only meteorological phenomenon with which the noise can be connected appears to be the diurnal and annual range of the amount of cloud, which it closely follows; whence Dr. Trabert concludes that although it may have some connection with earth currents, it is probably primarily due to the electricity of the clouds. The report also contains good photogravures of a cumulus cloud driven by a strong wind over the Tauris mountains, at an elevation of about 10,000 feet.

A discussion took place some time ago in our columns on "The Alleged Absoluteness of Rotation." In connection with this subject we have pleasure in calling attention to a recent paper by Dr. Benedict Friedlaender and Herr Immanuel Friedlaender, bearing the title "Absolute oder relative Bewegung?" (Berlin: Leonhard Simion), in which the *pros* and *cons* of the three different hypotheses are discussed, as well as the possibility of an experimental solution of the question.

We have received from Prof. Ángel Gallardo, of Buenos Ayres, an interesting pamphlet on Karyokinesis. In it the author presents the physico-mechanical hypothesis of figures of cell-division and some of its consequences, founded on the views of recent writers, without, however, attempting to investigate the influence of this hypothesis on the more important questions of biology.

Four new volumes have been published in M. Léauté's Encyclopédie scientifique des Aide-Mémoire. In "La Distillation des Bois," M. Ernest Barillot describes the plant and processes utilised in the distillation of wood for the production of methyl alcohol, acetic acid, charcoal, tar, &c. A volume entitled "Chaleur et Energie," by M. E. Ariès, is an exposition of the principles of thermodynamics according to a method based upon the postulate that "Un système ne peut décrire un cycle ferme irréversible, à l'aide d'une seule source de chaleur, sans lui *céder de la chaleur* et sans *consommer du travail*." The work is divided into two parts, the first dealing with the general principles of the science of heat, and the second with thermodynamics. The last chapter is devoted to the description of a general method for the application of thermodynamical principles. Lieut.-Colonel Hennebert contributes to the Series a volume on "Travaux de campagne." In this book, the author reviews the means of organisation of attack and defence of an army in the field, victualling, encampments, and the construction and use of various military works. The same author is responsible for a volume on "Communications militaires." In this, roads, navigable waters, railways, and bridges are examined successively from a military point of view, means of destruction as well as construction being described.

A prospectus has reached us giving particulars of a work on "Submarine Telegraphy," by Mr. Charles Bright, which will, provided a sufficient measure of support is obtained in advance, be published by Messrs. Crosby Lockwood and Son. The book, though based upon Wünschendorff's "Traité de Télégraphie sous Marine," has been thoroughly revised and brought up-to-date, and is practically a new work. Besides being a *résume* of the science and practice of submarine telegraphy, both from an electrical and engineering aspect, the book contains a complete history of this particular application of science from its birth, practically speaking, in 1850 up to 1895, with a short sketch of that which preceded in land telegraphy, and a prelude concerning all early efforts connected with signalling of any description.

Messrs. Whittaker and Co. are about to publish an authorised translation, by Mr. Lucien Serraillier, of Mr. D. Farman's work on "Automobiles." The work will be fully illustrated, and contain constructional details of the latest developments in this branch of work.

Mr. Quaritch has sent to us his catalogue, dated August, of choice and valuable books offered for sale by him. The list contains particulars of very many rare and choice works relating to most branches of science.

Messrs. Simpkin, Marshall, and Co., Ltd., will, on October 3, issue the first number of *The Avenue*, a monthly illustrated magazine devoted to education, association, and social progress.

The additions to the Zoological Society's Gardens during the past week include a Squirrel Monkey (*Chrysothrix sciurea*) from Guiana, presented by Mr. A. C. Goude; a Rhesus Monkey (*Macacus rhesus*, ♀) from India, presented by Mr. W. Stevens; three Ivory Gulls (*Pagophila eburnea*), a Richardson's Skua

(*Stercorarius crepidatus*) from Spitzbergen, presented by Mr. J. F. Studley; two Variegated Sheldrakes (*Tadorna variegata*) from New Zealand, presented by Sir Walter L. Buller, K.C.M.G.; two Streaky-headed Grosbeaks (*Poliospiza gularis*) from South Africa, presented by Miss Jessie Porter; an Oyster-catcher (*Himantopus ostralegus*), British, presented by Mr. R. Gurney; a Bordeaux Snake (*Coronella girondica*), a Common Snake (*Tropidonotus natrix*, var.) from France, presented by Mr. E. A. Minchin; a Squirrel Monkey (*Chrysothrix sciurea*) from Guiana, a Beccari's Cassowary (*Casuarius beccari*) from New Guinea, a Red Kangaroo (*Macropus rufus*, ♀) from Australia, deposited; two Otters (*Lutra vulgaris*) from Ireland, four Cayenne Lapwings (*Vanellus cayennensis*) from South America, purchased; a Chinese Mynah (*Acridotheres cristatellus*) from China, received in exchange; an African Wild Ass (*Equus tæniopus* ♀) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

DOUBLE STAR OBSERVATIONS.—In *Ast. Nach.*, No. 3370, Dr. Doberck, while discussing the elements of η Coronæ Borealis, takes the opportunity to determine the probable error that accompanies the observation of position angle and distance in the case of the better-known double star observers. Three stars have been selected for the discussion. η Coronæ, a close double, in which the probable errors are referred to a common distance of 0″·7; α Centauri, reduced to a mean distance of 10″, and, of course, including a different class of observers; and γ Virginis, with a mean distance of 2″·5. Dr. Doberck might with advantage have given the aperture of the telescope with which the observations have been made, but a glance at the list is sufficient to show that the greatest accuracy, as might have been anticipated, is on the side of the large telescopes. In the case of η Coronæ, Profs. Hall and Burnham are the only observers whose probable errors fall below 1° in position angle. In distance, their only competitor is M. Perrotin, who also has the advantage of large aperture. With γ Virginis, where the components are more widely separated, telescopes of moderate size are able to compete advantageously, and the measures of MM. Duner and Schiaparelli appear quite as trustworthy as those of Prof. Hall. The probable errors attached to observations made in the southern hemisphere are, on the whole, slightly larger than those derived from northern observers.

VARIABLE STARS.—Owing to the rapid accumulation of new material, which seems to be coming in on all sides, Dr. Chandler thinks that a new edition of his catalogue, incorporating everything up to date, is necessary. With this we entirely agree with him; for, although the system of supplements is a good one, they *can* accumulate, and when this happens the sooner they can be eliminated the better. Our readers are so familiar with these catalogues, that little need be said when it is stated that Dr. Chandler has entirely overhauled the work, and brought in all the new material. It is good, however, to hear, as he says, that the "degree of uniformity and completeness of the observation of the phenomena, and the consequent development of our knowledge with regard thereto, during the past few years is remarkable." He adds, however, further that the need for volunteers in the southern hemisphere is pressing (*Astronomical Journal*, No. 379).

VARIABLE STAR OBSERVATIONS.—Profs. Barnard and Chandler have both called attention to possible errors introduced into the observation of variable stars from physiological causes. The latter thinks that a systematic error arising from unequal sensitiveness of different portions of the retina, dependent upon different positions of the variable star with reference to those with which it is compared at different hour angles, can be traced in the case of the minimum phase of U Pegasi. Mr. A. W. Roberts, in the *Astronomical Journal*, No. 381, urges the employment of some mechanical means for the elimination of this source of error. He himself has been in the habit of using both a negative and a direct-vision eyepiece, and taking the mean of the two observations. In this way, it is asserted, the mean error of observation has fallen from 0·12 mag. to about 0·05 mag. The obvious suggestion of employing a prism mounted behind the eyepiece, and taking four observations in such a manner that the comparison star is rotated 90° about the variable, is not lost sight of; and when this arrangement is carried into effect, it is confidently anticipated that the mean error will not be greater than 0·03 mag. It is needless to point out that this implies a greater degree of accuracy than has been attained with any photometer. The probable error in the case of the Harvard photometer has been quoted as 0·075 mag., and Drs. Müller and Kempf, with the Zöllner photometer at Potsdam, have not been able to make their probable error much below 0·06 mag. Mr. Roberts' experiment will, therefore, be watched with considerable interest.

THE CAPE OBSERVATORY.—The Observatory Report for 1895 furnishes several items of general interest. The fine equatorial, presented by Mr. McClean, is in an advanced state, the only part not yet commenced being the line-of-sight spectroscope. Besides the cylindrical observatory and hemispherical dome, the donor has generously provided a rising floor of excellent design, and also an attached building containing entrance hall, study, developing room, and instrument store. The objective prism of 24 inches aperture has been completed by Sir Howard Grubb. The chief part of the year has been occupied in clearing off arrears of reduction and publication. The publications during the year included—"The Cape General Catalogue for 1885, with Appendices, &c."; "A Determination of the Solar Parallax and the Mass of the Moon from Heliometer Observations of the Minor Planets Iris, Victoria, Sappho"; the first volume of the "Cape Photographic Durchmusterung," containing the mean places of 152,000 stars for 1875, derived from Cape photographs between Declinations − 19° and − 37°; a complete account of the "Geodetic Survey of South Africa." Much actual observational work has been entirely suspended to allow of these publications being completed. It is also mentioned that an increase of staff will be required for the new astrophysical department created by the advent of the McLean telescope. With the transit instrument 2872 stars have been observed, the small number being due to the objects being chiefly slow-moving circumpolar stars. The work with the astro-photographic telescope has been satisfactory. 91 catalogue plates were taken, 55 of these being finally passed. 367 chart plates were exposed, 240 being passed. This leaves 15 catalogue and 253 chart plates yet to be done to complete the complement assigned to the Cape. A complete investigation of the réseau used here (Gautier No. 8), has been made, and will soon be published. The observations made with the zenith telescope in 1892, 1893 and 1894, for aberration and change of latitude, are completely reduced, and are being finally revised.

AN INVESTIGATION ON ABERRATION AND ATMOSPHERIC REFRACTION.—The latest volume of the publications of the Washburn Observatory of the University of Wisconsin (vol. ix.) contains an investigation, by Mr. George C. Comstock, on "Aberration and Atmospheric Refraction." It may be remembered that M. Lœwy pointed out the extended use of the equatorial telescope and its adaptation to new lines of research through the introduction of reflecting surfaces in front of the objective. The method adopted here, however, deviates widely from Lœwy's, for reasons given by the author in the introduction. Instead of the employment of a prism in front of the object-glass (the fundamental idea of the apparatus designed by M. Lœwy), the reflecting surfaces of which were the silvered faces of an equiangular glass prism, Mr. Comstock substituted for it three plane mirrors of rectangular cross-section. By this means he was able to overcome the great drawback, met with when using the prism, of the deformations of the prism arising from changes of temperature, and producing errors of focus which seemed to be insuperable with this type of apparatus. A detailed description of the mirrors and method of mounting, too long to be referred to here, is given. Mr. Comstock next enters on the determinations of the errors of the apparatus, and gives tables of the instrumental constants that follow, a description and investigation of the micrometer employed, and the effect of aberration and refraction upon the apparent distance between two stars respectively. Several other points are investigated, which he found were important after a preliminary trial of the method he adopted. From the discussion of 822 observations of the angular distances separating thirty-nine pairs of stars made by two observers, it appeared, as he says, "that the apparatus as employed is capable of furnishing a very considerable degree of precision, the probable error of a single observation made under normal conditions being ± 0″·30, *i.e.* less than a millionth part of the quantity measured." As mentioned before, the observations were made to determine, from the annual variations